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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,842	11/26/2003	Jagdish Narayan	5051.621	9294
20792	7590	11/15/2005	EXAMINER	
MYERS BIGEL SIBLEY & SAJOVEC			NGUYEN, DAO H	
PO BOX 37428			ART UNIT	
RALEIGH, NC 27627			PAPER NUMBER	
			2818	

DATE MAILED: 11/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/723,842

Applicant(s)

NARAYAN ET AL.

Examiner

Dao H. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-64 is/are pending in the application.
- 4a) Of the above claim(s) 8-28 and 46-64 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 38-45 is/are allowed.
- 6) ☒ Claim(s) 1-7, 29 and 30 is/are rejected.
- 7) ☒ Claim(s) 31-37 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>0204 & 0605 & 0705</u> . | 6) <input checked="" type="checkbox"/> Other: <u>Reasons for allowances</u> . |

DETAILED ACTION

1. This Office Action is in response to the communications dated 11/26/2003 through 08/24/2005.

Claims 1-64 are active in this application.

Acknowledges

2. Receipt is acknowledged of the following items from the Applicant.
 - a. Information Disclosure Statement (IDS) filed on 02/10/2004, 06/16/2005, 07/06/2005, and 07/26/2005. The references cited on the PTOL 1449 form have been considered.

Applicant is requested to cite any relevant prior art if being aware on form PTO-1449 in accordance with the guidelines set for in M.P.E.P. 609.

- b. This application claims the benefit of U.S. Provisional Application No. 60/430,210, filed 12/02/2002.

Election/Restriction

3. Application's election with traverse to prosecute the invention of Group II, claims 1-7 and 29-45, drawn to method of forming semiconductor devices, filed 08/24/2005 is acknowledged.

The traversal is on the ground(s) that see the election paper. This is not found persuasive because the fields of search for method claims, which is classified in class 438, and device claims, which is classified in class 257, are NOT coextensive and the determinations of patentability of method and device claims are different, that is process limitations and device limitations are given weight differently in determining the patentability of the claimed inventions. Also, the strategies for doing text searching of the device claims and method claims are different. Thus, separate searches are required.

The requirement is still deemed proper and is therefore made **FINAL**.

Claims 8-28 and 46-64 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a non-elected group there being no allowable generic or linking claim.

Applicant has the right to file a divisional application covering the subject matter of the non-elected claims.

4. Applicant is reminded that a complete reply to this Office Action should include cancellation of nonelected claims or other appropriate action (37 CFR 1.144). See MPEP § 821.01. Also, upon the cancellation of claims to a non-elected invention, the

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inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a diligently filed petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(h).

Specification

5. The specification has been checked to the extent necessary to determine the presence of possible minor errors. However, the applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

6 The claim is objected for the following reason: In claim 31, line 4, the preposition "an" should be changed to --a--. Appropriate correction is required.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claim(s) 1, and 5-7 are rejected under 35 U. S. C. § 102 (e) as being anticipated by U.S. Patent Application Publication No. 2004/0168626 by Moeck et al., and/or by U.S. Patent Application Publication No. 2004/0146560 to Whiteford et al.

Regarding claim 1, Moeck discloses a method for forming a nanostructure, comprising self-assembling a nanodot array in a matrix material from a nanodot material based upon a difference in Gibb's free energy of oxidation of the nanodot material and the matrix material. See paragraphs [0032]-[0034], [0062]-[0066]. See also examples 1-3 and 6.

Alternately, Whiteford discloses a method of forming a nanostructure, comprising self-assembling (paragraph [0050]) a nanodot array in a matrix material (paragraphs [0032], [0045], [0047], [0050], [0086], [0092]) from a nanodot material based upon a difference in Gibb's free energy of oxidation of the nanodot material and the matrix material. See also paragraphs [0010]-[0012]; [0015]-[0016]; [0019]-[0021]; [0024]-[0026]; [0071]-[0073]; [0086]-[0087]; [0092]-[0093].

Regarding claim 5, Whiteford discloses a method further comprising oxidizing the matrix material substantially simultaneously with the self-assembly of the nanodot array. See paragraph [0072].

Regarding claim 6, Whiteford discloses the method wherein self-assembling a nanodot array in a matrix material is performed repetitively to form a plurality of self-assembled nanodot arrays stacked on one another. See paragraphs [0012]-[0013].

Regarding claim 7, Whiteford discloses the method wherein at least three nanodot arrays are self-assembled on one another. See paragraphs [0012]-[0013].

9. Claim(s) 29-30 are rejected under 35 U. S. C. § 102 (e) as being anticipated by U.S. Patent Application Publication No. 2003/0108683 by Wu.

Regarding claim 29, Wu discloses a method for promoting the self-assembly of nanodots, as shown in figs. 1-2, comprising:

- providing a deposition apparatus having a deposition chamber 90;
- providing a target comprising a nanodot material 40 within the deposition chamber 90;
- providing a substrate 94b within the deposition chamber 90;
- forming a plasma of nanodot material in the deposition chamber 90 by evaporating at least a portion of the target comprising a nanodot material 40, wherein the plasma forms at least one nanodot material containing monolayer on the substrate 94b; and

allowing the at least one nanodot material containing monolayer on the substrate to self-assemble into nanodots of the nanodot material. See also paragraphs [0024]-[0030]; [0038]-[0046]; [0062]-[0067].

Regarding claim 30, Wu discloses the method wherein said nanodot material comprises a nanodot material selected from the group consisting of nickel, nickel alloys, platinum, platinum alloys, aluminum, aluminum alloys, magnesium, magnesium alloys, iron, and iron alloys. See paragraphs [0052]-0059].

Claim Rejections - 35 U.S.C. § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

11. Claim(s) 2-4 are rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent Application Publication No. 2004/0168626 by Moeck et al., or by U.S. Patent Application Publication No. 2004/0146560 to Whiteford et al., in view of the following remarks.

Regarding claims 2-4, Moeck and/or Whiteford does not necessarily teach that the difference in Gibb's free energy of oxidation between the nanodot material and the

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matrix material is at least 100 kcal per mole; or between about 100 kcal per mole and about 200 kcal per mole; or about 150 kcal per mole.

However, it would have been obvious to one having ordinary skill in the art at the time the invention was made that since the difference in Gibb's free energy of oxidation between the nanodot material and the matrix material is depending on the material(s) being used for the nanodot material and the matrix material, and both Moeck and Whiteford use numerous materials for the nanodot material and the matrix material, therefore, the difference in Gibb's free energy of oxidation between the nanodot material and the matrix material in the inventions of Moeck and/or Whiteford can be at various corresponding values. See paragraphs [[0012]-[0015]; [0062]-[0069]; and examples 1-8 of Moeck; or paragraphs [0086]-[0087]; [0111]-[0113] of Whiteford.

Allowable Subject Matter

12. Claim(s) 31-37 are objected to as being dependent upon a rejected base claim 29, but would be allowable if rewritten in independent form to all of the limitations of the base claim and any intervening claims, and to overcome the above objection, since the prior art of record and considered pertinent to the applicant's disclosure does not teach or suggest the claimed method for promoting the self-assembly of nanodots comprising (in addition to the other limitations in the claim) forming a plasma of matrix material in the deposition chamber by evaporating at least a portion of a target comprising a matrix

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material provided within the chamber, wherein the plasma forms a layer of matrix material on the substrate and any nanodots assembled thereon.

Reasons for Allowance

13. Claim(s) 38-45 would be allowed.

The following is an examiner's statement of reason for allowance:

None of the references of record teaches or suggests the claimed method for forming nanodots on a substrate comprising (in addition to the other limitations in the claim) forming a layer of target material on the substrate; then reacting oxygen with the layer of target material, wherein at least a portion of the oxygen reacts with a first portion of the target material to form a matrix material and a second portion of the target material self-assembles into nanodots.

Conclusion

14. A shortened statutory period for response to this action is set to expire 3 (three) months and 0 (zero) day from the day of this letter. Failure to respond within the period for response will cause the application to become abandoned (see M.P.E.P 710.02(b)).

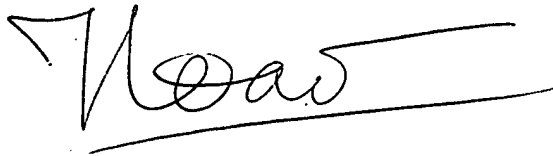
15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao H. Nguyen whose telephone number is (571)272-

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1791. The examiner can normally be reached on Monday-Friday, 9:00 AM – 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms can be reached on (571)272-1787. The fax numbers for all communication(s) is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

A handwritten signature in black ink, appearing to read 'Dao H. Nguyen', with a long horizontal line extending from the end of the signature.

Dao H. Nguyen
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November 13, 2005

A handwritten signature in black ink, appearing to read 'David Nelms', with a large loop at the top.

David Nelms
Supervisory Patent Examiner
Technology Center 2800